NASA Procedural Requirements

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Subject: NASA Environmental Management System

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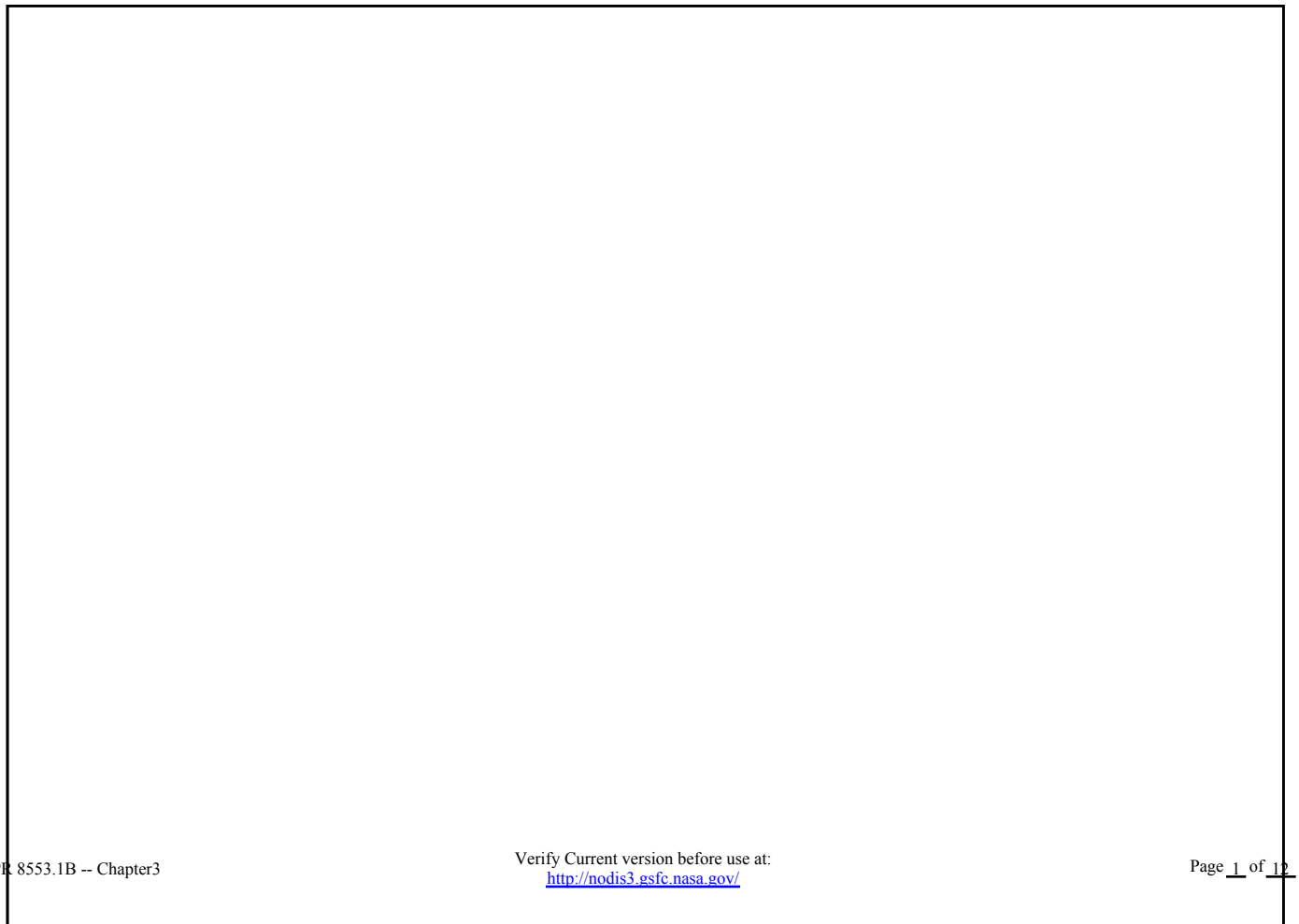
Chapter 3. Planning

3.1 Environmental Aspects

3.1.1 Purpose. To identify priority environmental aspects and impacts essential to developing NASA's EMS.

a. Center management shall follow each of the steps described in Figure 1 below. Center employees are expected to apply best professional judgment when applying this process.

b. The following diagram and notes illustrate the recommended order of steps for this process. Center management shall complete all steps.



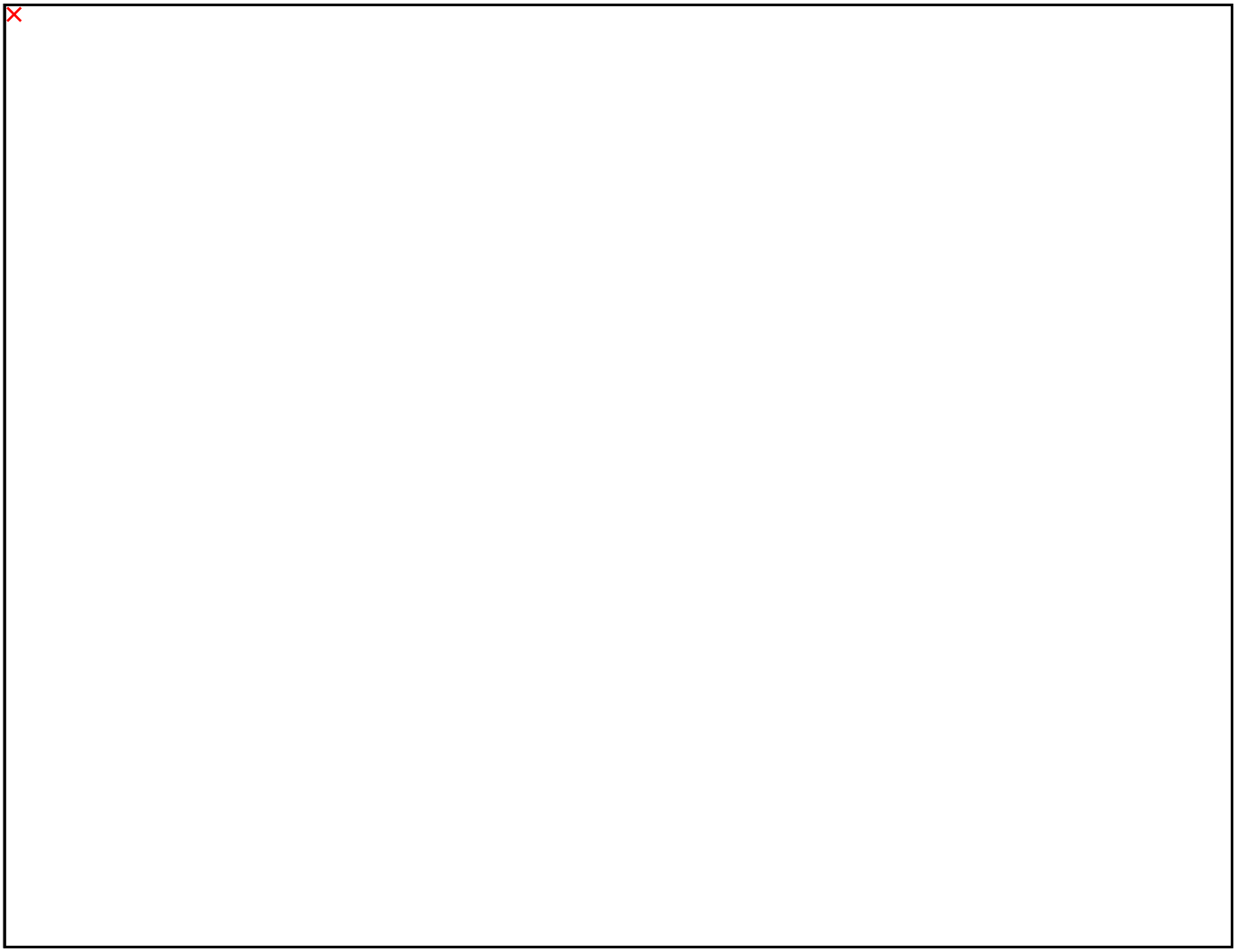


Figure 1: Flow Diagram of Overall Process for Identifying Environmental Aspects and Impacts and Determining High-Priority Environmental Aspects

3.1.2 Flow Diagram Notes

a. In steps 1 to 3, a list of environmental aspects is developed, and the environmental aspects are grouped into categories.

b. Once environmental aspects have been categorized, steps 4 to 6 assign applicable impact categories and associated impact severity and frequency.

c. To establish the level of priority for an environmental aspect, the risk or benefit associated with each associated environmental impact is defined in step 7, using a combination of the severity and probability of the environmental impact.

3.1.3 **Step 1**: List all activities, products, and services.

a. Within the scope of its EMS, each Center Director shall identify all activities, products, and services under its control, as well those activities, products, and services over which it should be expected to have control pursuant to its mission, based on the nature and scale of its operations.

3.1.4 **Step 2**: Identify environmental aspects and impact(s).

a. Center management shall determine the environmental aspects and impacts associated with the activities, products, and services identified in step 1.

b. Past activities, products, and services with environmental impacts that potentially require management in the present or future shall be considered.

c. Environmental impacts associated with activities, products, and services that are planned for the future with a reasonable degree of certainty shall be considered.

d. In the identification of present and future environmental impacts, Center management shall consider normal,

abnormal, and emergency conditions.

(1) Abnormal and emergency conditions that can be reasonably foreseen shall be considered.

(2) Where separate environmental impacts have been identified based on consideration of normal, abnormal, and emergency conditions, each environmental impact shall be subject to steps 4 through 7 below.

(3) Where environmental impacts or their severity or probability (See steps 4, 5, and 6) vary, depending upon different conditions, these variations may need to be considered as separate environmental impacts when determining priority level, or the highest severity and frequency scores may be chosen.

3.1.5 **Step 3**: Group environmental aspects and impacts for manageability, and assign environmental aspect categories.

a. Where practical, Centers may group environmental aspects and associated environmental impacts to ensure that further analysis is manageable.

b. Center management shall take the output from step 2, and any grouping that has been conducted in step 3, and assign environmental aspect categories as appropriate.

c. Where an environmental aspect and its associated environmental impacts may apply to more than one environmental aspect category, the environmental aspect category shall be selected based on best professional judgment.

d. The Center is free to determine the category in which an individual environmental aspect belongs, but may not add or change the following list of 16 environmental aspect categories. Examples of areas included in the environmental aspect categories are provided. Aspect category 16 allows for Center-specific, unique aspects.

Table 1: Environmental Aspect Categories

1	**Air Emissions**, including: Stationary and point sources. Mobile sources. Ozone-depleting substances. Fugitive emissions. Greenhouse gases.
2	**Cultural Resources**, including: Archaeological resources. Historic resources.
3	**Efficient Fleet Management**, including: Acquisition of alternative-fuel vehicles. Alternative-fuelinfrastructure. Fleet size reductions. Fuel use reductions.
4	**Energy/Water Consumption**, including: Reduction in energy use. Reduction in water consumption. Use of renewable energy.
5	**Environmental Impacts Review**, including: Environmental justice. National Environmental Policy Act (NEPA). Noise. Non-ionizing radiation. Odors. Socioeconomic impacts.

6	**Fuel, Oils, and Lubricants**, including: Container storage. Storage tanks. Transformers. Hydraulic systems. Spill prevention control and countermeasures.
7	**Hazardous materials**, including: Hazardous materials storage. Emergency planning and response. Community right-to-know. Reduction in the quantity of toxic and hazardous chemicals and materials acquired, used, or disposed of (e.g., reuse).
8	**Regulated waste**, including: Collection and storage. Off-site shipment and disposal. Hazardous waste. Hazardous waste recycling. Hazardous waste treatment, storage, and disposal facilities. Medical waste. State-regulated industrial or chemically contaminated wastes. Universal and special waste.
9	**Natural resources**, including: Land use and resources. Wetlands and floodplains. Threatened and endangered species. Wildlife. Ecosystems. Oceans and coastal zones.
10	**Remediation/Restoration**, including: Comprehensive Environmental Response, Compensation, and Liability Act sites. Resource Conservation and Recovery Act sites. Tank sites.
11	**Solid waste (non-hazardous)**, including: General trash. Construction waste. Solid waste landfills. Waste prevention and recycling.
12	**Sustainable acquisition**, including: Affirmative procurement/Green purchasing. Electronics stewardship.
13	**Sustainable facilities**, including: Encroachment. High-performance and sustainable buildings.

14	**Toxic substances**, including: Asbestos. Lead products (including paint). Mercury. Polychlorinated biphenyls. Pesticides/herbicides. Radioactive materials.
15	**Water quality**, including: Drinking water. Groundwater. Storm water. Sanitary or domestic wastewater. Industrial wastewater. Eutrophication.
16	**Other, Center-unique aspects:**

3.1.6 **Step 4**: Categorize environmental benefits (B)/impacts (I).

a. A "high-priority environmental aspect" is a NASA environmental aspect that shall be managed to:

(1) Avoid or prevent a serious adverse environmental impact.

(2) Create a substantial beneficial environmental impact.

b. Classify each individual or grouped environmental aspect by assigning associated environmental benefits/impacts into one or more of the following seven categories:

(1) Safety.

(2) Natural and Cultural Resources (NCR).

(3) Environmental Legal/Regulatory Implications (L&R).

(4) Performance.

(5) Reputation and Stakeholder Relationships (R&S).

(6) Cost.

(7) Schedule.

c. Both adverse impacts (I) and beneficial impacts (B) shall be considered within the framework of the table of NASA EMS Benefits (B)/Impacts (I) categories listed in Table 2.

d. The Center may adjust the EMS B/I scoring in the table below to meet the needs of the site. The objective of this scoring system is to ensure that only a few aspects will receive the highest scores in any category. Center management shall ensure that the adjustments to the scoring are both geared to drive this objective and are documented.

Table 2: NASA EMS Benefit (B)/Impact (I) Categories

Safety	Score
(B/I) Negligible benefit or impact	1
(B) Avoids source of nuisance or irritant (I) Nuisance or irritant	2
(B) Avoids minor injury or human health impact (I) Minor injury or human health impact	3

(B) Eliminate source of substantial injury/lost time or human health impact (I) Potential source of substantial injury/lost time or human health impact	4
(B) Eliminate potential source of death or disabling injury (I) Potential source of death or disabling injury	5

Natural and Cultural Resources (NCR)	Score
(B/I) Negligible impact or benefit on natural or cultural resources.	1
(B) Results in minor improvement to natural or cultural resources. (B) Results in minor improvement in sustainable practices. (I) Minor impact on natural or cultural resources.	2
(B) Supports conservation of natural or cultural resources. (B) Results in moderate improvement in sustainable practices. (B) Moderate reduction of impacts on natural or cultural resources. (I) Moderate impact on natural or cultural resources.	3
(B) Prevents substantial impact to onsite, protected, natural or cultural resources. (B) Results in substantial restoration or conservation of/improvements to onsite protected natural or cultural resources. (B) Results in substantial improvement in sustainable practices. (I) Substantial onsite impact on protected natural or cultural resources.	4
(B) Prevents off-site damage to natural or cultural resources. (B) Results in expanded off-site natural or cultural resources. (B) Results in sustainable off-site improvement in sustainable practices. (I) Off-site damage to natural or cultural resources.	5

Legal and Regulatory Implications (L&R)	Score
(B/I) Negligible regulatory action.	1
(B) Improve relationship with regulators. (B) Avoids an informal notice. (I) Informal notice.	2
(B) Avoids a potential notice of violation with no fine. (B) Minor incentive, such as eliminates a minor regulatory requirement. (I) Notice of violation with no fine.	3
(B) Major incentive, such as regulatory relief. (I) Significant fine, consent agreement, unilateral order, or noncompliance with legal and other requirements.	4

(B) Significant incentive, such as eliminates significant regulatory requirement. (I) Work stoppage. (I) Criminal sanctions.	5

Performance	Score
(B/I) Negligible impact to mission/institutional capability.	1
(B) Temporary enhancement of mission/institutional capability. (I) Temporary loss of mission/institutional capability.	2
(B) Moderate enhancement to mission/institutional capability. (I) Moderate loss of mission/institutional capability. Workaround available.	3
(B) Significant enhancement to mission/institutional capability. (I) Significant loss of mission/institutional capability. Workaround available.	4
(B) Permanent enhancement to mission/institutional capability. (I) Permanent loss of mission/institutional capability.	5

Reputation and Stakeholder Relationship (R&S)	Score
(B/I) Negligible media interest or effect on NASA reputation or stakeholder relations.	1
(B) Minor increase in positive public inquiries or stakeholder support. (I) Minor adverse effect on NASA reputation or stakeholder relations.	2
(B) Moderate increase in positive public inquiries or stakeholder support. (I) Moderate adverse effect on NASA reputation or stakeholder relations.	3
(B) Substantial increase in positive public inquiries or stakeholder support. (I) Substantial adverse effect on NASA reputation or stakeholder relations.	4
(B) Major increase in positive public inquiries or stakeholder support. (I) Major increase in negative public inquiries/mandatory meeting attendance. (I) Potential mission impact.	5

Cost	Score
(B/I) Negligible benefit or cost impact.	1
(B/I) Net benefit or cost of less than $50,000.	2

(B/I) Net benefit or cost of $50,000 to less than $100,000.	3
(B/I) Net benefit or cost of $100,000 to $500,000.	4
(B/I) Net benefit or cost of greater than $500,000.	5

Schedule	Score
(B/I) Negligible schedule change.	1
(B) Accelerates mission/project schedule by 1 day to less than 1 month. (I) Delay to mission/project schedule by 1 day to less than 1 month.	2
(B) Accelerates mission/project schedule by 1 month to less than 3 months. (I) Delay to mission/project schedule by 1 month to less than 3 months.	3
(B) Accelerates mission/project schedule by 3-6 months. (I) Delay to mission/project schedule by 3-6 months.	4
(B) Accelerates mission/project schedule by greater than 6 months. (I) Delay to mission/project schedule by greater than 6 months.	5

3.1.7 **Step 5**: Determine the environmental benefit (B)/impact (I) severity score for each category.

a. For each environmental aspect, Center management shall use the environmental impact category in Table 2 to determine the numerical score (benefit or impact) for the applicable impact category with the highest potential B/I.

b. Center management shall ensure that severity scores include the effect of management controls in place to mitigate environmental impacts or secure existing benefits.

3.1.8 **Step 6**: Determine the probability score for each aspect category.

a. For each environmental aspect, Center management shall assign a numerical, probability-based score to each environmental aspect, using the applicable B/I categories and the probability rating of the benefit/impact.

b. Center management shall ensure that probability scores include the effect of management controls in place to mitigate environmental impacts or secure existing benefits.

c. Taking into account the historical record of such an incident occurring, Center management shall use the table below to determine the probability score of the scenario occurring.

d. Center management shall assign the score that corresponds with the probability rating.

Table 3: NASA EMS Probability Scoring

Probability Rating	Ordinal Value	Description of Risk Probability (Examples)
Very Low	1	Qualitative: Very unlikely to occur, management not required in most cases. Either strong controls are in place or are not required. OR **Frequency**: Minimum of once every 10+ years

Low	2	Qualitative: Not likely to occur, management not required in all cases. Current controls have minor limitations/uncertainties, may need to be strengthened. OR **Frequency**: Once every 5 years to once every 10 years
Moderate	3	Qualitative: May occur, management required in some cases. Current controls exist with some uncertainties, need for review is evident. OR **Frequency**: Once a year to once every 5 years
High	4	Qualitative: Highly likely to occur, most cases require management attention. Current controls have significant uncertainties, corrective actions likely. OR **Frequency** : Once a month to once a year
Very High	5	Qualitative: Nearly certain to occur, requires immediate management attention. Current controls have little or no effect, implementation of corrective action is mandatory. OR **Frequency**: Continuous to once a month.

3.1.9 **Step 7**: Determine overall priority level.

a. Center management shall determine the priority level of the associated environmental aspect based on the environmental benefit/impact severity versus probability using the 5x5 Risk Matrix illustrated in the following figure.

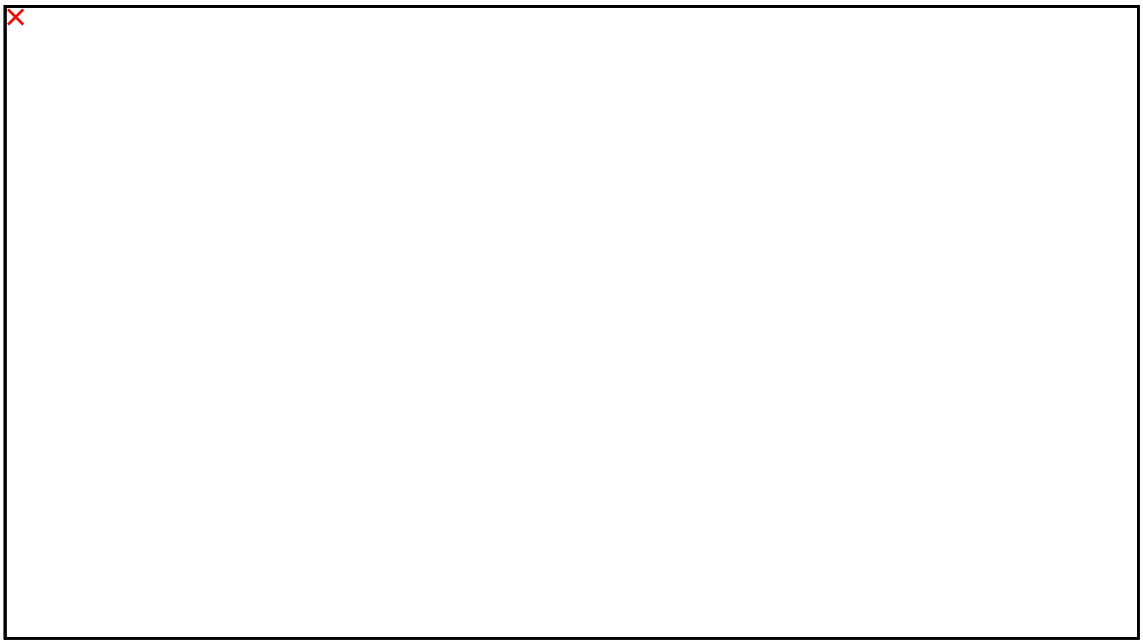


Figure 2: 5x5 Risk Matrix

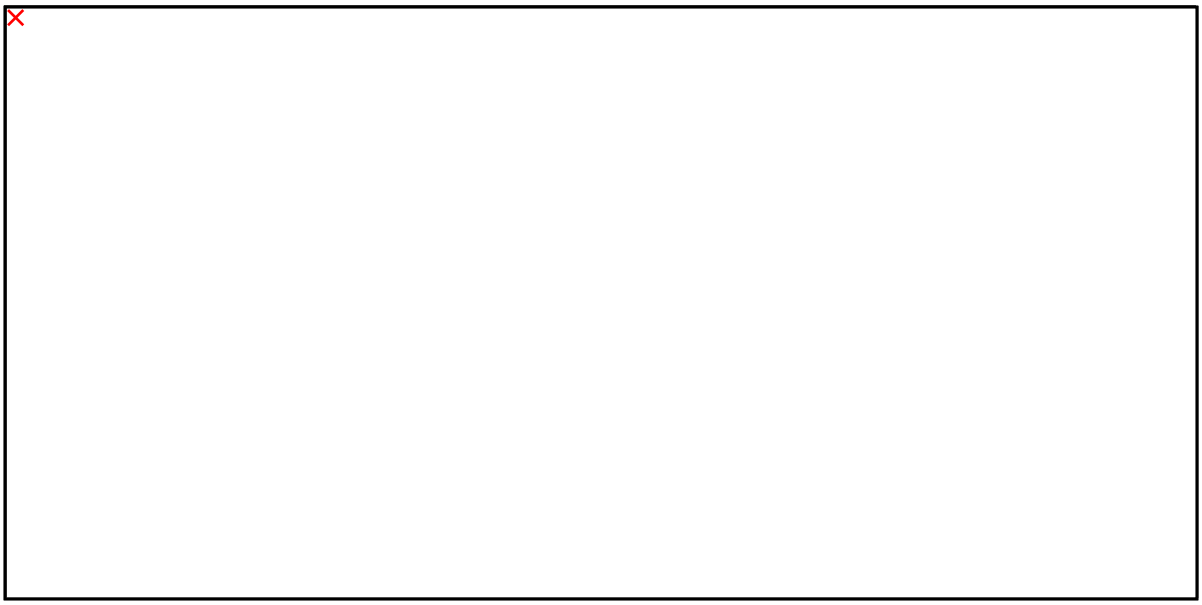


Figure 3: Priority-Level Categories

The overall priority level for each environmental aspect is determined by the benefit/risk associated with the most severe B/I scores.

If contractor personnel conduct steps 1 through 6, the appropriate NASA authority personnel shall review and approve, modify, or reject the data or request further analysis, in addition to making the overall risk-ranking determination.

3.1.10 **Step 8**: Set objectives and targets.

a. Center management shall determine which environmental aspects, associated with activities, products, and services, require objectives and targets as defined in Chapter 3.3.

b. Consideration shall be given to the goals that have been established within EO 13423.

3.2 Legal and Other Requirements

3.2.1 Purpose. To establish and maintain a procedure to identify all relevant legal and other requirements applicable to the environmental aspects of NASA's activities, products, and services.

a. The NASA Center management shall develop, implement, and maintain procedures for the evaluation of legal and other requirements, as well as proposed changes to existing legal and other requirements, for applicability to Center activities and operations.

b. The legal and other requirements shall be taken into account in establishing, implementing, and maintaining the Center's EMS.

c. The relationship to the environmental aspects shall be established for the legal and other requirements to which the Center subscribes.

d. The Center management shall evaluate NASA-wide and Center agreements and commitments for their applicability to the Center's environmental aspects.

e. The applicable legal and other requirements shall be made available to appropriate individuals at the Center.

f. The Center management shall provide information identified under Step 3.2.a to Mission Directorates and Mission Support Offices when requested.

g. The Center management shall consult with their Office of Chief Counsel, as necessary, in fulfilling responsibilities under Chapter 3.2.

3.3 Objectives, Targets, and Programs

3.3.1 Purpose. To set forth requirements for establishing environmental objectives and targets that demonstrate commitment consistent with the intent of NASA environmental policy and the environmental aspects established through the EMS process.

a. Objectives and targets shall be established at all appropriate organizational levels as needed for the implementation and maintenance of the EMS.

b. Objectives and targets shall be established consistent with the environmental policy.

c. The determination of the need for objectives and targets shall be made by the appropriate NASA authority. However, the actual objectives and targets may be suggested by other interested parties.

d. When establishing objectives and targets, management at each Center shall consider the following:

(1) Legal and other requirements to which the organization subscribes.

(2) Priority environmental aspects.

(3) Available technology options and infrastructure.

(4) Operational, mission, and mission-related activities.

(5) Financial resources.

(6) Interests and views of stakeholders.

e. Specific objectives and targets that are technically feasible and economically reasonable shall be established by Center management for high-priority environmental aspects.

f. If the determination is made that a high-priority environmental aspect cannot be addressed with one or more objectives and targets due to being technically infeasible or economically unreasonable, the rationale behind this determination shall be documented.

g. Objectives and targets shall be made measurable where practical.

h. Objectives and targets shall be reviewed and updated as needed.

i. Center management shall develop objectives and targets to address the goals established in Section 2 of EO 13423, Strengthening Federal Environmental, Energy, and Transportation Management, as appropriate.

j. Objectives and targets may be established by Center management for medium- or low-priority aspects, as necessary, to address other Federal or Agency goals and commitments.

k. Environmental management programs (EMPs) shall be established, implemented, and maintained by Center management for achieving the objectives and targets.

l. EMPs shall accomplish the following:

(1) Designate responsibility for achieving objectives and targets at each relevant function and level of organization.

(2) Demonstrate that NASA is addressing its identified objectives and targets.

(3) Address major compliance activities if applicable.

(4) Identify required resources (technical and financial) to carry out the EMPs.

(5) Establish the timeframes in which objectives and targets are to be achieved.

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